8. Special functions

8.1 Timed washing of the heat exchanger

8.1.1 Applications

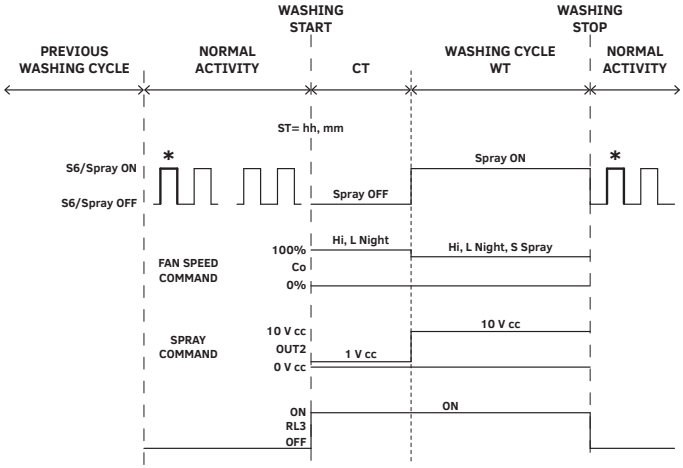
Presence of salt residues in the heat exchanger water.

***Note**: function only available AWS unit.*

8.1.2 "Washing forward" washing cycle

Washing is performed at most once a day, at the set time (**ST**). Following are the stages:

Step	Description
1	Stop the supply of the fluid to the heat exchanger by activation of relay **RL3**.
2	Cooling of the heat exchanger for **CT** minutes. The fans rotate at the maximum speed (lower value between **Hi** and **LNight**).
3	Washing the heat exchanger for **WT** minutes by activating the spray unit. The fans rotate at the maximum speed allowed of the settings (lower value between **LSpray**, **Hi** and **LNight**).



***Note**: when this washing cycle is running, the "Washing forward" message appears on the display.*

***Note**: washing is performed if, and only if, in the preceding operating period (Normal Activity) there was at least one activation of the spray (*).*

***Note**: if the controller is stopped during the washing cycle (input **S2** = closed), or if there is a power outage or water cutoff, the current cycle is considered finished.*

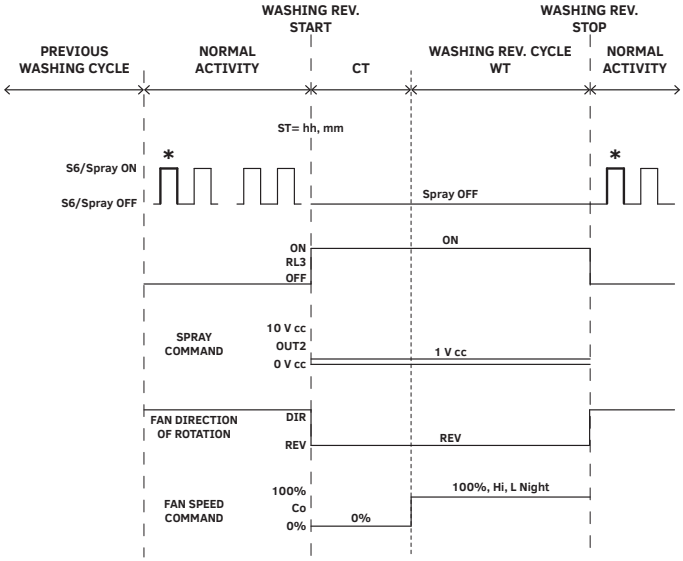
8.1.3 "Washing reverse" washing cycle

***Note**: function only available with EC fan control by Modbus control.*

***Note**: when this washing cycle is running, the "Washing Rev." message appears on the display.*

Washing is performed at most once a day, at the set time (**ST**). Following are the stages:

Step	Description
1	Disabling of the spray unit (output voltage **OUT** = 1 V)
2	Activation of washing sprays inside the heat exchanger and stop the supply of the fluid to the heat exchanger by activation of relay **RL3**.
3	Standby for **CT** minutes for gravity draining of the washing water. The fans are stopped.
4	Activation for **WT** minutes of the fans at 100% of the speed or at the maximum speed allowed of the settings (lower value between **Hi** and **LNight**). The fans rotate in the opposite direction of normal operation.



***Note**: if the controller is stopped during the washing cycle (input **S2** = closed), or if there is a power outage or water cutoff, the current cycle is considered finished.*

8.1.4 Setting Parameters

See "Timed washing of the heat exchanger" on page 97.

8.2 Heat exchanger power management

8.2.1 Applications

More precise control of the fluid exiting the heat exchanger, modulating the ability to disperse the heat in the exchanger in proportion to the effective need. Reduction in the energy consumption.

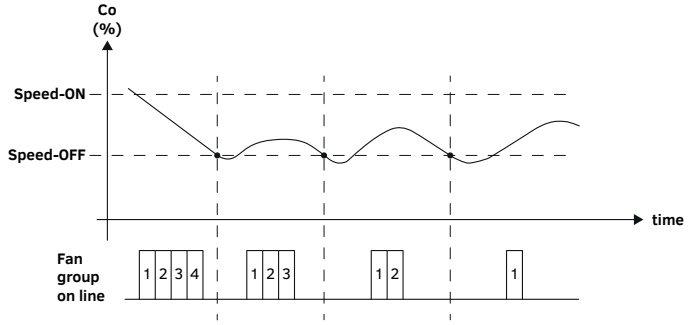
8.2.2 Reduction in the heat dissipation capacity

***Note**: function only available with EC fan control by Modbus control.*

The heat exchanger power is controlled by regulating the air flow rate to the fans. Once the fans have reached the minimum speed, the capacity of the heat exchanger to dissipate the thermal power can be further reduced by stopping a few.

If the control command value of the **Co** fans falls below the **Speed OFF** value, the controller deactivates a fan unit. Wait for **Pause** seconds for the system to stabilize. Normally **Co** returns above **Speed OFF**. If and when **Co** falls below **Speed OFF** once again, the controller deactivates the next fan unit.

This operation is repeated until the last fan unit, which remains active and follows the value **Co**. When **Co** is 0%, all the **Pause** timers still active are zeroed.



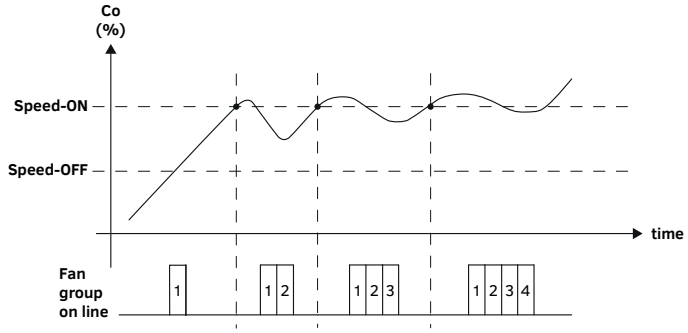
8.2.3 Increase in heat dissipation capacity

***Note**: function only available with EC fan control by Modbus control.*

The heat exchanger power is controlled by regulating the air flow rate to the fans. To reach maximum capacity of the heat exchanger to dissipate the thermal power, all of the fan units must be activated.

If the control command value of the **Co** fans exceeds the **Speed ON** value, the controller activates the next fan unit. Wait for **Pause** seconds for the system to stabilize. Normally **Co** returns below **Speed ON**. If and when **Co** rises above **Speed ON** once again, the controller activates the next fan unit.

This operation is repeated until the last fan unit. When **Co** is 100%, all the **Pause** timers still active are zeroed.



8.2.4 Setting Parameters

See "Heat exchanger power management" on page 97.

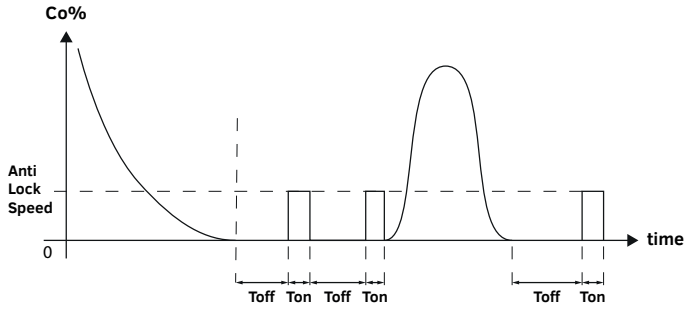
8.3 Fan anti-locking

8.3.1 Applications

Long downtimes or winters with snow and ice accumulation on the guard grid to avoid damaging the fans.

8.3.2 Operation

If the control command value **Co** is 0% for **TOff** minutes, all of the fans are activated at a constant **Anti Lock Speed** for **TOn** minutes.



8.3.3 Setting Parameters

See "Fan anti-locking" on page 98.

8.4 Night limits for speed using internal clock

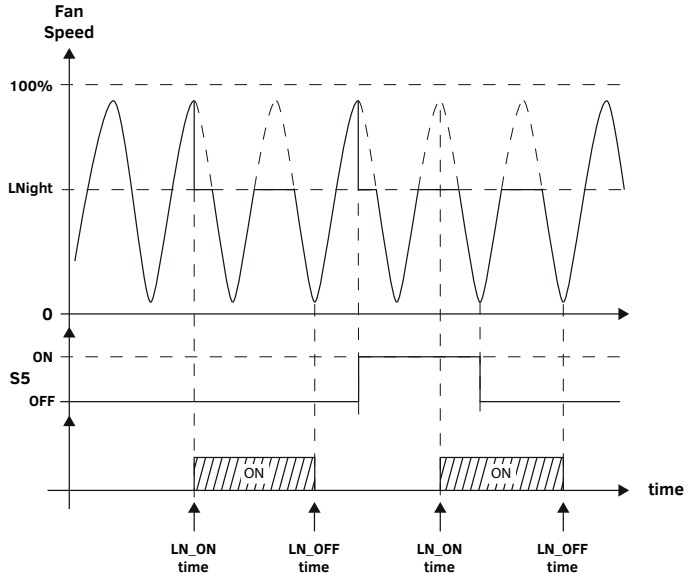
8.4.1 Applications

Activation of the night speed limit using the controller's internal clock.

8.4.2 Operation

The night maximum speed limit, **LNight**, is activated in the time interval between **LN ON Time** until **LN Off Time**.

***Note**: the function is in parallel to the command defined by input **S5**.*



8.4.3 Setting Parameters

See "Night limits for speed using internal clock" on page 99.

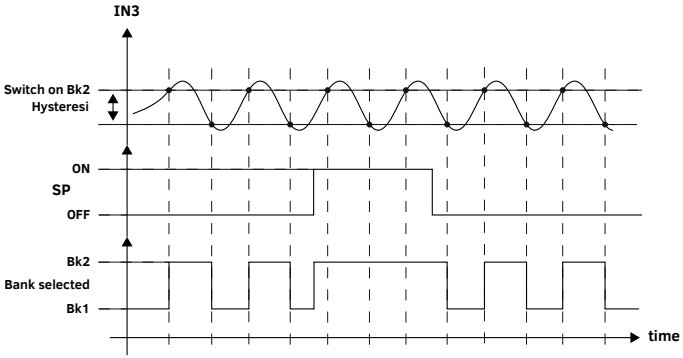
8.5 Switching of setpoint following the ambient temperature from IN3 (Bank Switch)

8.5.1 Operation

***Note**: with this function active, the other functions that use analog input **IN3** are not available.*
The active parameter set (**Bk1** or **Bk2**) is defined as the temperature value read on analog input **IN3**:

- it is **Bk2** if the temperature is greater than the **Switch on Bk2** value
- it is **Bk1** if the temperature is less than the (**Switch on Bk2** -**Hysteresis)** value

If the On/Off **SP** = On, the active parameter set is always **Bk2**, regardless of the temperature value read.



8.5.2 Setting Parameters

See "Switching of setpoint following the ambient temperature from IN3 (Bank Switch)" on page 100.

8.6 Timed cleaning of the heat exchanger

8.6.1 Applications

Paper, leaves and/or dust present on the heat exchanger.

8.6.2 Operation

Cleaning is performed at most once a day, at the set time for the set amount of time. The fans turn in the direction opposite the normal working direction and at the set speed.

***Note**: function only available with ebm-papst EC fan control by Modbus control.*

8.6.3 Setting Parameters

See "Timed cleaning of the heat exchanger" on page 100.

8.7 Adjustment of the setpoint following the external temperature IN3 (Floating SP)

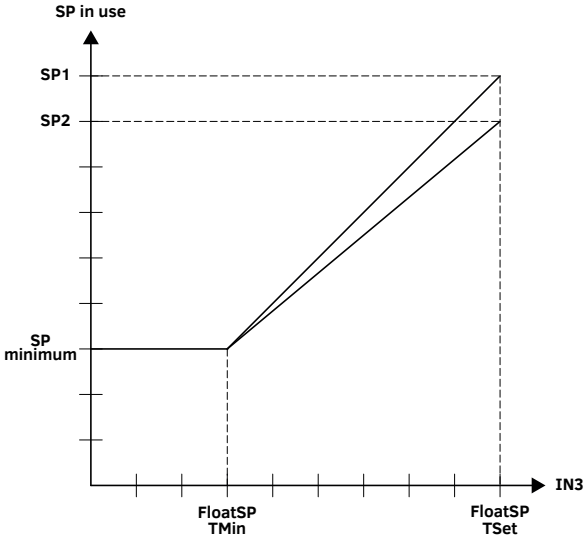
8.7.1 Operation

***Note**: function available only in Master mode.*

***Note**: with this function active, the other functions that use analog input **IN3** are not available.*

The active setpoint value, **SP**, is modified in proportion to the external temperature value of the temperature probe connected to the analogue input **IN3**.

The working zone is the range between the **FloatSP TMin** and **FloatSP TSet** temperatures. When the **FloatSP TMin** temperature is reached, the setpoint reaches the minimum set value, **SP Minimum**; when it reaches the **FloatSP TSet** temperature, the setpoint equals the setpoint entered (**SP1**/**SP2**).



8.7.2 Operating example

Following is an example of the values taken by **SP** as the temperature detected by **IN3** varies:

	IN3	rPr420	rPr015	rPr025	rPr030	rPr045	rUu-05	rPu030	rUu010	rtE-01	rtE-02
	0,0°C	10,0 mA	6,9 bar	10,8 bar	9,7 bar	14,0 bar	1,9 V	9,8 bar	4,0 V	19,6 °C	19,6 °C
FloatSP Tmin	5,0°C(*)	10,0 mA	6,9 bar	10,8 bar	9,7 bar	14,0 bar	1,9 V	9,8 bar	4,0 V	19,6 °C	19,6 °C
	10,0°C(*)	12,0 mA	8,8 bar	14,0 bar	13,4 bar	19,6 bar	2,4 V	13,5 bar	5,0 V	32,5 °C	32,5 °C
FloatSP Tset	15,0°C(*)	14,0 mA	10,6 bar	17,0 bar	17,0 bar	25,0 bar	2,9 V	17,0 bar	6,0 V	45,0°C	45,0°C
	20,0°C(*)	14,0 mA	10,6 bar	17,0 bar	17,0 bar	25,0 bar	2,9 V	17,0 bar	6,0 V	45,0°C	45,0°C

***Note (*)**: the area of variation of **SP** as a function of the **IN3** value with the default values.*

8.7.3 Setting Parameters

See "Adjustment of the setpoint following the ambient temperature from IN3 (Floating SP)" on page 101.

8.8 Adjustment of external setpoint with 0-10 V signal from IN3

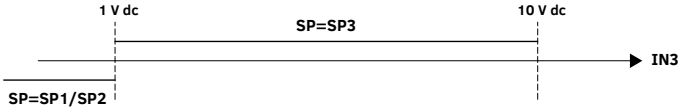
8.8.1 Operation

***Note**: function available only in Master mode.*

***Note**: with this function active, the other functions that use analog input **IN3** are not available.*

The active setpoint value **SP** depends on the 0-10 V signal connected to input **IN3**:

- it is **SP1**/**SP2** if the signal is between 0 and 1 V.
- it is the value set using input **IN3** (**SP3**) if the signal is between 1 and 10 V.



8.8.2 Operating example

Following is an example of the values taken by **SP3** as the **IN3** signal varies:

IN3	rPr420	rPr015	rPr025	rPr030	rPr045	rUu-05	rPu030	rUu010	rtE-01	rtE-02
0.0 V	SP1-2	SP1-2	SP1-2	SP1-2	SP1-2	SP1-2	SP1-2	SP1-2	SP1-2	SP1-2
1.0 V	4.1 mA	0.1 bar	0.3 bar	0.4 bar	0.6 bar	0.5 V	0.1 bar	0.0 V	-11.6 °C	-11.6 °C
2.0 V	5.9 mA	1.8 bar	3.1 bar	3.6 bar	5.4 bar	0.8 V	2.9 bar	1.1 V	0.0 °C	0.0 °C
5.0 V	11.2 mA	6.8 bar	11.3 bar	13.6 bar	20.6 bar	2.3 V	12.9 bar	4.5 V	34.7 °C	34.7 °C
10.0 V	20.5 mA	15.5 bar	25.8 bar	30.9 bar	46.5 bar	5.2 V	30.5 bar	10.3 V	94.7 °C	94.7 °C

8.8.3 Setting Parameters

See "Adjustment of external setpoint with 0-10 V signal from IN3" on page 102.

8.9 Input Slave Safety mode from IN3

8.9.1 Operation

***Note**: it is necessary to setup a Master configuration to be used if there is no 4–20 mA signal. The controller must be connected to suitable measurement transducers for the set Master configuration. The Master configurations available and the necessary transducers/sensors are those normally defined for the controller.*

***Note**: with this function active, the other functions that use analog input **IN3** are not available.*

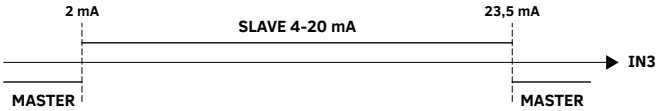
The operating mode of the controller (Slave/master) depends on the 4-20 mA signal from input **IN3**:

- Slave control with signal between 2 and 23.5 mA (normal operation)
- Master control with signal less than 2 mA and greater than 23.5 mA (emergency operation)

Emergency operation is indicated by the opening of relay RL2 (relative LED off) and the "**Slave SafeKO**" message, see "Warning messages" on page 106.

In Slave mode, the control output is proportional to the input signal, see "Slave proportional mode" on page 39.

***Note**: the analog output OUT1 follows the Slave or Master mode active at that time if the parameter **C7** = **output SLAVE 0-10V**. The OUT2 analog output cannot be used.*



8.9.2 Setting Parameters

See "Input Slave Safety mode from IN3" on page 103.